Translation

PATENT COOPERATION TREATY

PCT/DE2003/003381

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

| | | |
|---|---|---|
| Applicant's or agent's file reference<br>IT573WO | **FOR FURTHER ACTION** | See Form PCT/IPEA/416 |
| International application No.<br>PCT/DE2003/003381 | International filing date (*day/month/year*)<br>08 October 2003 (08.10.2003) | Priority date (*day/month/year*)<br>11 October 2002 (11.10.2002) |
| International Patent Classification (IPC) or national classification and IPC<br>G03F 7/00 | | |
| Applicant<br>INFINEON TECHNOLOGIES AG | | |

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☐ *(sent to the applicant and to the International Bureau)* a total of _____ sheets, as follows:

      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the report
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

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|---|---|
| Date of submission of the demand<br>06 May 2004 (06.05.2004) | Date of completion of this report<br>03 November 2004 (03.11.2004) |
| Name and mailing address of the IPEA/EP<br><br>Facsimile No. | Authorized officer<br><br>Telephone No. |

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/DE2003/003381

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is language of a translation furnished for the purpose of:

☐ international search (under Rules 12.3 and 23.1(b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ The international application as originally filed/furnished

☒ the description:

pages 1-14, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages 1-17, as originally filed/furnished

pages* _____, as amended (together with any statement) under Article 19

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1/5-5/5, as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/DE 03/03381

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Claims | 1-17 | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | 1-17 | YES |
| | Claims | | NO |
| Industrial applicability (IA) | Claims | 1-17 | YES |
| | Claims | | NO |

2. Citations and explanations

Reference is made to the following documents:

D1: WO 02/29870 A (MIKUCHI TAKASHI; MIYASHITA KAZUYUKI (JP); NIPPON KOGAKU KK (JP)) 11 April 2002 (2002-04-11)

D2: US-A-4 474 864 (LYONS CHRISTOPHER F ET AL) 2 October 1984 (1984-10-02)

D3: US 2003/058429 A1 (SCHRIEVER GUIDO) 27 March 2003 (2003-03-27)

D4: DE 102 04 994 (XTREME TECHNOLOGIES GMBH) 21 August 2003 (2003-08-21)

The invention relates to a device for the test irradiation of substrates with an EUV radiation source.

1. Novelty

D1, WO 02/29870 A, which is considered the closest prior art, discloses (see family member US-A-2003 170 552) in figure 2 a device for the test irradiation of a substrate coated with photosensitive paint (paragraph [0009]: 'a method is known which transfers a predetermined reticle pattern as a test pattern onto a test wafer a number of times each time with a different exposure dose amount...'), comprising a UV radiation source (1), an optical system

for filtering the radiation of the radiation source (paragraph [0096]: 'an energy roughly-adjusting unit 3'), a chamber for accommodating the substrate, and means for modifying the light path onto the substrate ('an illumination-system aperture stop plate 5') and a monitor detector in the direction of a partial light path behind the optical system and the light beam splitter 6 for detecting the radiation dose during the irradiation. In contrast to the subject matter of the present claim 1, an EUV source is not used, a mirror is not used for spectral filtering, and no closable apertures are arranged in front of the object that is to be irradiated so as to control the timing of the irradiation.

D2, US-A-4 474 864, discloses the test irradiation with UV light of a substrate coated with photosensitive paint (200-500 nm) so as to examine the reaction of the photosensitive layer to different doses. A photodiode is arranged in the light path for measuring the radiation dose. In contrast to the application, no closable diaphragm apertures are arranged in front of the object that is to be irradiated.

D3, US-A-2003 058429, relates to a device (paragraph [0045-0047], figure 1) for determining the pulse energy of an EUV source using a photodetector in the light path. The device has a multilayer mirror and a filter for spectral filtering. The radiation dose is adapted using diaphragm apertures. In contrast to the application, no closable diaphragm apertures are arranged in front of the object that is to be irradiated and there is no test irradiation of the wafer.

D4, DE-A-102 04 994, relates to a device for monitoring the energy fluctuations of an EUV light source during a

photolithographic method. Test irradiation of a wafer is not disclosed.

The subject matter of claim 1, and therefore of the dependent claims, is therefore novel (PCT Article 33(2)).

2. Inventive step

Proceeding from D1, the technical problem is that of enabling as rapid as possible an irradiation of a plurality of irradiation fields on the substrate so that a temporary degradation of the optical elements does not influence the desired test result. The solution to this problem is achieved as per the subject matter of claim 1 at least in that, to interrupt the light path, a plurality of closable diaphragm apertures are placed in front of the object that is to be irradiated so as to control the timing of the irradiation.

Neither D1 nor any of the other citations, either alone or in combination, suggests such an arrangement.

For the above-mentioned reasons, the subject matter of claim 1, and therefore of the dependent claims, is considered inventive (PCT Article 33(3)).

3. Industrial applicability

The industrial applicability of the claimed subject matter is clearly established (PCT Article 33(4)).